# Rapid Ecological Assessment for the Northwest Sands Ecological Landscape

## An Inventory and Analysis of Rare Plants and Animals and High-quality Natural Communities in Support of a Master Plan

Wisconsin's Natural Heritage Inventory Program
Bureau of Natural Heritage Conservation
Department of Natural Resources
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**Cover Photos**: Alder thicket along Bean Brook (Andrew Badje), golden-winged warbler (Brian Collins), softwater lake with mink frog habitat (Andrew Badje), dragon's-mouth orchid (*Arethusa bulbosa*, Richard Staffen), mink frog (Paul White).

## Table of Contents



## List of Tables



## List of Figures



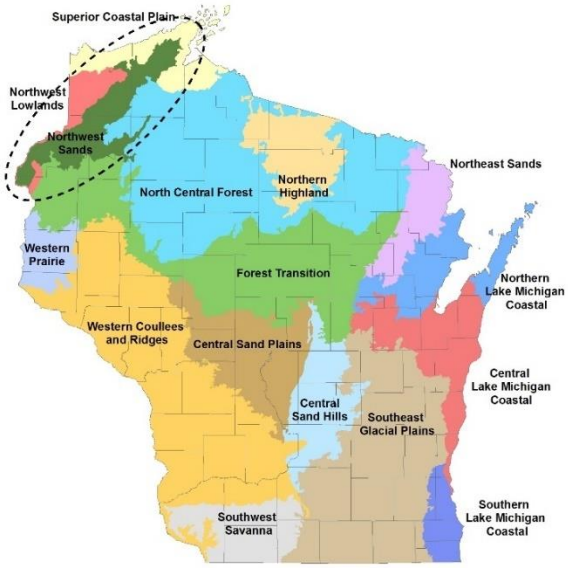
## List of Maps

# Introduction

## Purpose and Objectives

This report is intended to be used as a source of information for developing the master plan for the Northwest Sands Ecological Landscape (NWS EL).

The primary objectives of this project were to collect biological inventory information relevant to the master plan for properties in the NWS EL and to analyze, synthesize and interpret this information for use by the master planning team. This effort focused on assessing areas of documented or potential habitat for rare species and identifying natural community management opportunities.




**Map A.** Ecological Landscapes of Wisconsin.

Survey for the NWS EL were conducted in 2018 and focused on 1) identifying and evaluating ecologically important areas, including re-evaluating previously designated Primary Sites, 2) documenting or updating rare species occurrences, and 3) documenting or updating occurrences of high quality natural communities. This report serves as the "Biotic Inventory" document used for master planning. There will undoubtedly be gaps in our knowledge of the biota of this property, especially for certain taxa groups; these groups have been identified as representing either opportunities or needs for future work. Inventory data collected through this effort is a starting point for adaptive management of properties in the NWS EL and should be revisited periodically and updated when new information becomes available.

This inventory was limited to properties being actively planned that had not previously been inventoried by the Wisconsin DNR's Bureau of Natural Heritage Conservation (NHC) (Table 1). Previous inventories also relevant to the NWS EL should be consulted as necessary for a more complete assessment of the conservation opportunities for properties in the Northwest Sands (Table 2).

**Table 1. Properties included in the NWS EL rapid ecological assessment.**

| |
|---|
| Bean Brook Fishery Area |
| Clam Lake Fishery Area |
| Clam Lake Wildlife Area |
| Culbertson Springs Fishery Area |
| Flat Creek Wildlife Area |
| Goose Lake Wildlife Area (unofficial name) |
| Inch lake State Natural Area |
| Lampson Moraine Pines |
| McDermott Brook Fishery Area |
| McKenzie Creek Fishery Area |
| REM-Sand Lake |
| Spring Creek Fishery Area |
| Uhrenholdt Memorial Timber Demonstration Forest |

**Table 2. Properties in the NWS EL inventoried through previous NHI biotic inventory and rapid ecological assessments.**

| Property | Planning Group | Year Surveyed |
|---|---|---|
| Douglas County Wildlife Area | Northwest Barrens (WDNR 2009) | 2009 |
| Namekagon Barrens Wildlife Area | Northwest Barrens (WDNR 2009) | 2009 |
| Governor Knowles State Forest | Governor Knowles State Forest (WDNR 2010a) | 2007-2008 |
| White River Fishery Area | White River Planning Group (WDNR 2010b) | 2008 |
| Crex Meadows Wildlife Area | Glacial Lake Grantsburg (WDNR 2011) | 2010 |
| Fish Lake Wildlife Area | Glacial Lake Grantsburg (WDNR 2011) | 2010 |
| Amsterdam Sloughs Wildlife Area | Glacial Lake Grantsburg (WDNR 2011) | 2010 |
| Totagatic Wild River | Totagatic Wild River (WDNR 2013) | 2012 |
| Brule River State Forest | Brule River State Forest (WDNR 2016) | 2014-2016 |

# Overview of Methods

The Wisconsin Natural Heritage Inventory (NHI) program is part of the Wisconsin DNR's Bureau of Natural Heritage Conservation (NHC) and is a member of an international network of natural heritage programs representing all 50 states, as well as portions of Canada, Latin America, and the Caribbean. These programs share certain standardized methods for collecting, processing, and managing data for rare species and natural communities. NatureServe, an international non-profit organization (see *www.NatureServe.org* for more information), coordinates the network.

Natural heritage programs track certain elements of biological diversity: rare plants, rare animals, high-quality examples of natural communities, and other selected natural features. The NHI Working List (WDNR 2018) contains the elements tracked in Wisconsin. They include endangered, threatened, and special concern plants and animals, as well as the natural community types recognized by NHI. The NHI Working List is periodically updated to reflect new information about the rarity and distribution of the state's plants, animals, and natural communities. The most recent Working List is available from the Wisconsin DNR website (*Wisconsin Natural Heritage Working List*).

The Wisconsin NHI uses standard methods for biotic inventory to support master planning (Appendix A). Our general approach involves collecting relevant background information, planning and conducting surveys, compiling and analyzing data, mapping rare species and high quality natural community locations into the NHI database, identifying ecologically important areas, and providing interpretation of the findings through reports and other means.

Existing NHI data are often the starting point for conducting a biotic inventory to support master planning. NHC's biotic inventory projects typically start with a coarse-filter assessment, followed by targeted surveys for priority taxa, then data processing, analysis and report writing. Survey scope and intensity corresponds to the study area size and ecological complexity, as well as resource availability.

Taxa-specific field surveys for the EL were focused on documenting high quality natural communities, rare plants, breeding birds (including forest raptors), invertebrates (primarily bumblebees), small mammals, and herptiles (Table 3). The collective results from these surveys were used, along with other information, to identify, evaluate, and update ecologically important areas (Primary Sites) of the NWS EL.

**Table 3. Survey Targets and Methods for Biotic Inventory on the NWS EL in 2018.**

| Survey Target | Surveyors | Methods |
|---|---|---|
| Animals | | |
| Forest Raptors | NHC Staff | Broadcast call surveys for northern goshawk and red-shouldered hawk in likely habitat. |
| Breeding Birds | NHC Staff, Brian Collins | Surveys followed Wisconsin Breeding Bird Atlas II protocols. Emphasis placed on areas not covered by Atlas blocks. |
| Herps | NHC Staff | Calling surveys for frogs, visual encounter searches for turtles, snakes, lizards, salamanders, and frogs. |
| Small Mammals | NHC Staff | Transects with Sherman and pitfall traps in conifer and mixed conifer – hardwood forests targeting woodland jumping mouse, woodland deer mouse, northern flying squirrel, and near streams or waterbodies for water shrew. |
| Bumblebees | Wayne Steffens, NHC staff | Visual encounter surveys |
| Rare plants | NHC Staff | Meander surveys targeting peatlands, other wetlands, dry-mesic, and dry forests. Kayak surveys for rare aquatic plants. |
| Natural Communities | NHC Staff | Meander surveys focused on characteristic species, community boundaries, threats and management issues. |

Survey locations were identified or guided by using recent aerial photos, USGS 7.5' topographic maps, various Geographic Information System (GIS) sources, information from past survey efforts, discussions with property managers, and the expertise of several biologists familiar with the properties or with similar habitats in the region. Based on the location and ecological setting of properties within the NWS EL, key inventory considerations included the identification of oak and pine forests, barrens, peatlands, high-quality open and shrub-dominated wetlands, softwater lakes, stream corridors, and the location of habitats that had the potential to support rare species. Private lands, including easements, were not surveyed.

In this report, the first mention of plant species and invertebrate animals in the text is followed by scientific names in parentheses. Plant nomenclature follows the Wisconsin State Herbarium (WIS). Vertebrate animals follow standard common names.

For a description of the geology, historical vegetation, and current vegetation of the Northwest Sands EL, please see Chapter 17 of the Ecological Landscapes of Wisconsin (dnr.wi.gov, keyword Ecological Landscapes).

# Management Considerations and Opportunities for Biodiversity Conservation

The Ecological Landscapes of Wisconsin highlights six major conservation and management opportunities for the Northwest Sands Ecological Landscape (WDNR 2015a). These are summarized below, and a list of Primary Sites are presented under each item as examples. This list of sites is not meant to be exhaustive. Property planners and managers may identify important resources outside of primary sites by consulting the NHI Portal, NHI Biotic Inventory survey data or contractor reports, NHC District Ecologists, and other resources noted in the subsections below.

## Pine Barrens and Oak Barrens

The Northwest Sands EL is arguably the best place on the North American continent to manage for Pine Barrens and Oak Barrens, which are globally rare community types. Large-scale barrens management is possible here because of the suitability of the land, historical conditions, the presence of numerous remnants, and substantial public ownership. Pine barrens communities of northwestern Wisconsin historically included oak groves and variable densities of pines. In addition to managing for a range of patch sizes, it is desirable to include all structural and compositional stages of barrens, including not only open, "treeless" barrens and "brush prairie" but also oak or pine savannas (with scattered larger trees) and sites with scattered, denser stands of pine or oak interspersed with herb and shrub-dominated openings. In addition, the restoration of large connected landscapes that include pine-oak barrens and wetlands (especially the more open sedge meadows, marshes, and bogs) will benefit the area-sensitive species that occur here. While no properties inventoried in 2018 contain large barrens, other properties in the NWS EL, including those in the Northwest Barrens Planning Group (WDNR 2009), Glacial Lake Grantsburg Planning Group (WDNR 2011), and portions of the Brule River State Forest (WDNR 2016) are extremely important for barrens.

## Dry Forests: Jack Pine, Red Pine, Scrub Oak

Dense forests of jack pine, northern pin oak, and bur oak are now widespread and common throughout the ecological landscape. Historically, some of these dry forests included a significant component of red pine, but natural stands of red pine are presently rare here. All three native pine species have declined significantly since Euro-American settlement. Older forests of red pine, eastern white pine, and oaks did occur in certain landscape settings, but are now very rare, and opportunities to manage for forests with this composition and structure should be considered or planned for on appropriate sites. While no properties inventoried in 2018 contain large expanses of northern dry forests, other properties in the NWS EL, including those in the Northwest Barrens Planning Group (WDNR 2009), Glacial Lake Grantsburg Planning Group (WDNR 2011), and portions of the Brule River State Forest (WDNR 2016) are extremely important for this forest type.

## Wetlands: Emergent Marsh

Good examples of several kinds of marsh community, including emergent marsh, wild rice marsh, floating-leaved marsh, and submergent marsh, occur as important components of the wetland vegetation mosaic in the Northwest Sands. Marshes may develop along sluggish stretches of large rivers, on the margins of lakes, or in shallow basins that receive nutrients from the surrounding watershed via overland flow, an inlet stream, or groundwater. Wild rice marshes are especially well represented here compared to most other ecological landscapes. The rice marshes are highly significant, ecologically and culturally and warrant strong protection. A property inventoried in 2018 with a good example of marsh is:

- Clam Lake Wildlife Area (see Clam Lake Wild Rice Marsh primary site)

## Inland Lakes: Seepage Lakes and Drainage Lakes

The Northwest Sands harbors significant concentrations of glacial kettle lakes. These provide high quality habitats for aquatic organisms, for resident and migratory birds, and for many other species that make use of lacustrine ecosystems. Soft-water seepage lakes are especially common here, and some of these lakes support dense beds of submergent, floating-leaved, and emergent aquatic vegetation. Many rare plants also occur in these softwater lakes. Properties inventoried in 2018 with good examples of inland lakes include:

- Inch Lake State Natural Area (see also Inch Lake SNA primary site)
- Goose Lake
- Sand Lake

## River Corridors, Streams, and Springs

While large rivers are well-known in the Northwest Sands (e.g., Namekagon, St. Croix, Brule, etc.), smaller streams and spring complexes also occur here and provide important habitat and habitat corridors. These streams are also associated with important wetland communities, including emergent marsh, sedge meadow, alder thicket, northern tamarack swamp, and hardwood swamp. These wetland habitats also support rare species, especially golden-winged warbler where tall shrubs are present. Maintaining the integrity and connectivity of these wetlands is necessary to maintain high water quality in these rivers and streams, provide stable habitat for sensitive aquatic organisms, and retain or restore the ecological connections. Properties inventoried in 2018 with good examples of rivers, streams, or springs include:

- Bean Brook Fishery Area (see also Bean Brook Alders and Tamarack Swamp primary site)
- Clam River Fishery Area
- Culbertson Springs Fishery Area
- Flat Creek Fishery Area
- McDermott Brook Fishery Area
- McKenzie Creek Fishery Area
- Spring Creek Fishery Area

## Miscellaneous: Northern Dry-mesic Forest

Northern dry-mesic forests, composed of species such as eastern white pine, red pine, northern red oak, and red maple, are not common here but they are present and unlike some of the drier types, they do have old-growth and old forest management potential. This forest community is best developed where soil moisture and nutrient availability is higher than on the drought-prone ow nutrient sands that are prevalent over much of the Northwest Sands. Natural firebreaks such as lakes and streams historically helped determine the distribution and abundance of this type. Properties inventoried in 2018 with good examples of northern dry-mesic forest include:

- Lampson Moraine Pines State Natural area (see also Lampson Moraine Pine SNA primary site)
- Uhrenholdt Memorial Timber Demonstration Forest

# Wildlife Action Plan Implementation and the Northwest Sands Ecological Landscape

## Conservation Opportunity Areas

Conservation Opportunity Areas (COAs) are places in Wisconsin that contain ecological features, natural communities, or SGCN habitat that present the greatest likelihood of successfully implementing conservation actions when viewed from the global, continental, upper Midwest, or state perspective. Several COAs occur in the NWS EL.


## Opportunities for Natural Community Conservation

Opportunities for sustaining natural communities in Ecological Landscapes were developed in 2005 by the Ecosystem Management Planning Team (EMPT, published in 2007) and later focused on wildlife Species of Greatest Conservation Need and their habitat in the Wisconsin Wildlife Action Plan (WDNR 2015b). The goal of sustaining natural communities is to manage for natural community types that 1) historically occurred in a given landscape and 2) have a high potential to maintain their characteristic composition, structure, and ecological function over a long period of time (e.g., 100 years). This list can help guide land and water management activities so that they are compatible with the local ecology of the Ecological Landscape while maintaining important components of ecological diversity and function. Based on EMPT's criteria, these are the most appropriate community types that could be considered for management activities within each Ecological Landscape.

The Wisconsin Wildlife Action Plan (WDNR 2015b) identifies 27 natural communities for which there are “High” or “Moderate” opportunities for protection, restoration, or management on the Northwest Sands Ecological Landscape (Table 4). For information on conservation actions that are beneficial for these communities, please refer to the Wisconsin DNR website, keyword "Wildlife Action Plan".

**Table 4.** Natural Communities that occur on properties inventoried in 2018 with High or Moderate Opportunities for Protection, Restoration or Management in the Northwest Sands Ecological Landscape (WDNR 2015b).

| Community Type | |
|---|---|
| Alder Thicket | Northern Tamarack Swamp |
| Aspen-Birch | Northern Wet Forest |
| Black Spruce Swamp | Northern Wet-mesic Forest |
| Coldwater streams | Oak Barrens |
| Conifer Plantation | Open Bog |
| Coolwater streams | Pine Barrens |
| Emergent Marsh | Poor Fen |
| Floating-leaved Marsh | Riverine Impoundment |
| Large Lake--shallow, soft, seepage | Spring Pond, Lake--Spring |
| Muskeg | Springs and Spring Runs (Soft) |
| Northern Dry Forest | Submergent Marsh |
| Northern Dry-mesic Forest | Surrogate Grasslands |
| Northern Hardwood Swamp | Wild Rice Marsh |
| Northern Sedge Meadow | |

## Opportunities to Conserve Species of Greatest Conservation Need (SGCN) and Rare Plants

The Wisconsin Wildlife Action Plan also notes Species of Greatest Conservation Need (SGCN; WDNR 2015d) associated with each Ecological Landscape. Species of Greatest Conservation Need are animals that have low and/or declining populations that need conservation action. They include various birds, fish, mammals, reptiles, amphibians, and invertebrates (e.g., dragonflies, butterflies, and freshwater mussels) that are:

- Are already listed as threatened or endangered;
- Have few, low, or declining populations, and/or threats their populations or habitats;
- Are stable in number in Wisconsin, but declining in adjacent states or nationally;
- Have biological, genetic or ecological characteristics that place them at risk or make them vulnerable to decline.

There are 98 SGCN and 20 rare plants highly or moderately associated with the Northwest Sands Ecological Landscape. This means that these species are significantly associated with the EL, and that restoration of natural communities with which these species are associated would significantly improve their conditions.

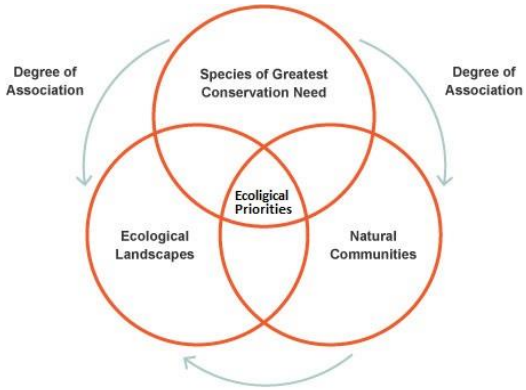



**Figure 1.** Diagram of ecological priorities based on the Wildlife Action Plan.

The Wisconsin Wildlife Action Plan also identifies conservation opportunities by highlighting the natural communities in each Ecological Landscape that are most important to the SGCN. While many communities that occur on the NWS EL have major or important conservation opportunities, some of these communities support more SGCN and rare plant species than others (Figure 2). For example, pine barrens, oak barrens, and

young seral stages of northern dry forests support a significant number of rare species. Although all of these rare species do not necessarily occur on DNR properties, natural communities with higher species counts provide a disproportionate benefit to a greater number of SGCN and rare plants across the NWS EL and may warrant special consideration in the master planning process. This intersection of SGCN and rare plants with priority natural communities represents the best opportunities for management on the NWS EL from an ecological and biodiversity perspective. For a complete list of which SGCN associated with the Northwest Sands Ecological Landscape, please see the Wisconsin Wildlife Action Plan website (https://dnr.wi.gov/, keyword "Wildlife Action Plan"), or for species associated with specific natural communities, see the natural community pages (https://dnr.wi.gov/, keyword "Natural Communities").

Taxa and species-specific conservation opportunities in the Northwest Sands EL include:

- This EL offers the best opportunity in the state to manage for numerous barrens-associated rare plants, sharp-tailed grouse, upland sandpiper, common nighthawk, and other area-sensitive barrens species. Mature jack pine forests also support the rare Connecticut warbler.
- There are landscape opportunities in the Northwest Sands to manage for the Federally Endangered Kirtland's warbler.
- The Federally Endangered Karner blue butterfly occurs in good numbers in the southern half of the Ecological Landscape along with other conservative terrestrial invertebrates.
- The north-south orientation of the major river corridors with their relatively unbroken forests provide important habitat for migratory birds and other animals.
- The extensive swamps of northern white-cedar, spruce-tamarack, and muskeg/open bog support boreal birds at their southern range limits.
- Large sedge meadows in the southwestern part of the Northwest Sands provide excellent habitat for uncommon marshbirds (yellow rail, American bittern, Nelson's sparrow), breeding grounds for waterfowl and waterbirds, and good numbers of Blanding's turtles and rare amphibians.
- Alder Thicket supports important species such as wood turtle, the core of the Wisconsin golden-winged warbler population, American woodcock, and snowshoe hare.
- The Northwest Sands provides one of the last and best landscapes in the state for Franklin's ground-squirrel
- Many populations of rare dragonflies, mussels, and aquatic beetles have been documented in the larger rivers of the EL.
- This ecological landscape is especially important for conserving and managing the Wisconsin Threatened gilt darter.

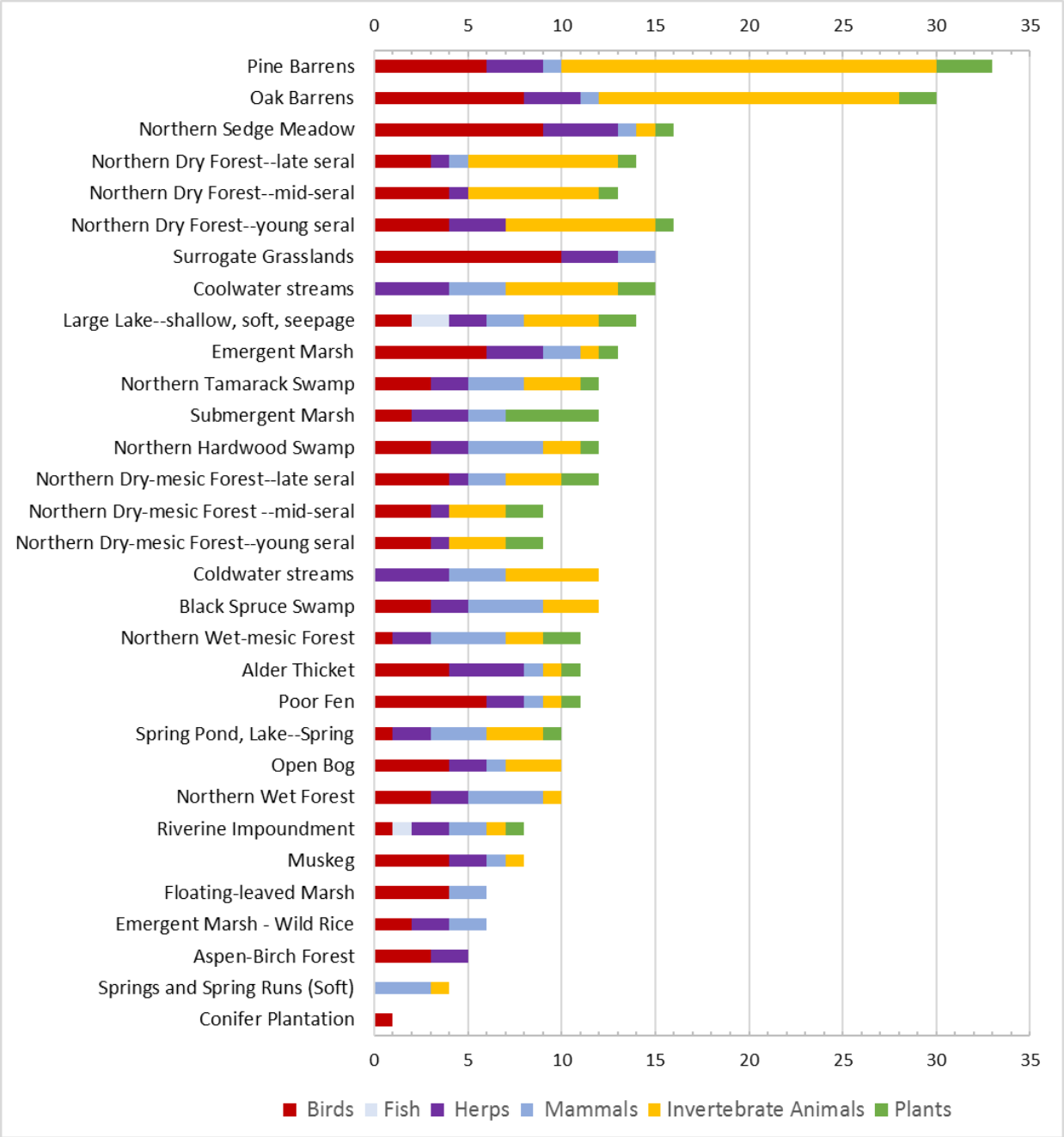



**Figure 2.** Number of SGCN and Rare Plants Highly or Moderately Associated with Natural Communities that have High or Moderate Opportunities for Protection, Restoration or Management in the Northwest Sands Ecological Landscape.[1]

[1] Figure represents the SGCN and rare plants that are moderately or highly associated with the respective natural communities. Species and natural communities represented are limited to those that are moderately to highly associated with the Northwest Sands Ecological Landscape.

# Primary Sites: Site-specific Opportunities for Biodiversity Conservation

Four ecologically important sites were identified on the Northwest Sands Ecological Landscape (NWSEL) during surveys in 2018. These "Primary Sites" were delineated because they generally encompass the best examples of:

1) Rare and representative natural communities,
2) Documented occurrences of rare species populations, and/or
3) Opportunities for ecological restoration or connections.

**Table 5.** Northwest Sands Rapid Ecological Assessment Primary Sites based on 2018 surveys.

| Code | Primary Site Name |
|---|---|
| NWSEL01 | Inch Lake SNA |
| NWSEL02 | Bean Brook Alders and Tamarack Swamp |
| NWSEL03 | Clam Lake Wild Rice Marsh |
| NWSEL04 | Lampson Moraine Pines SNA |

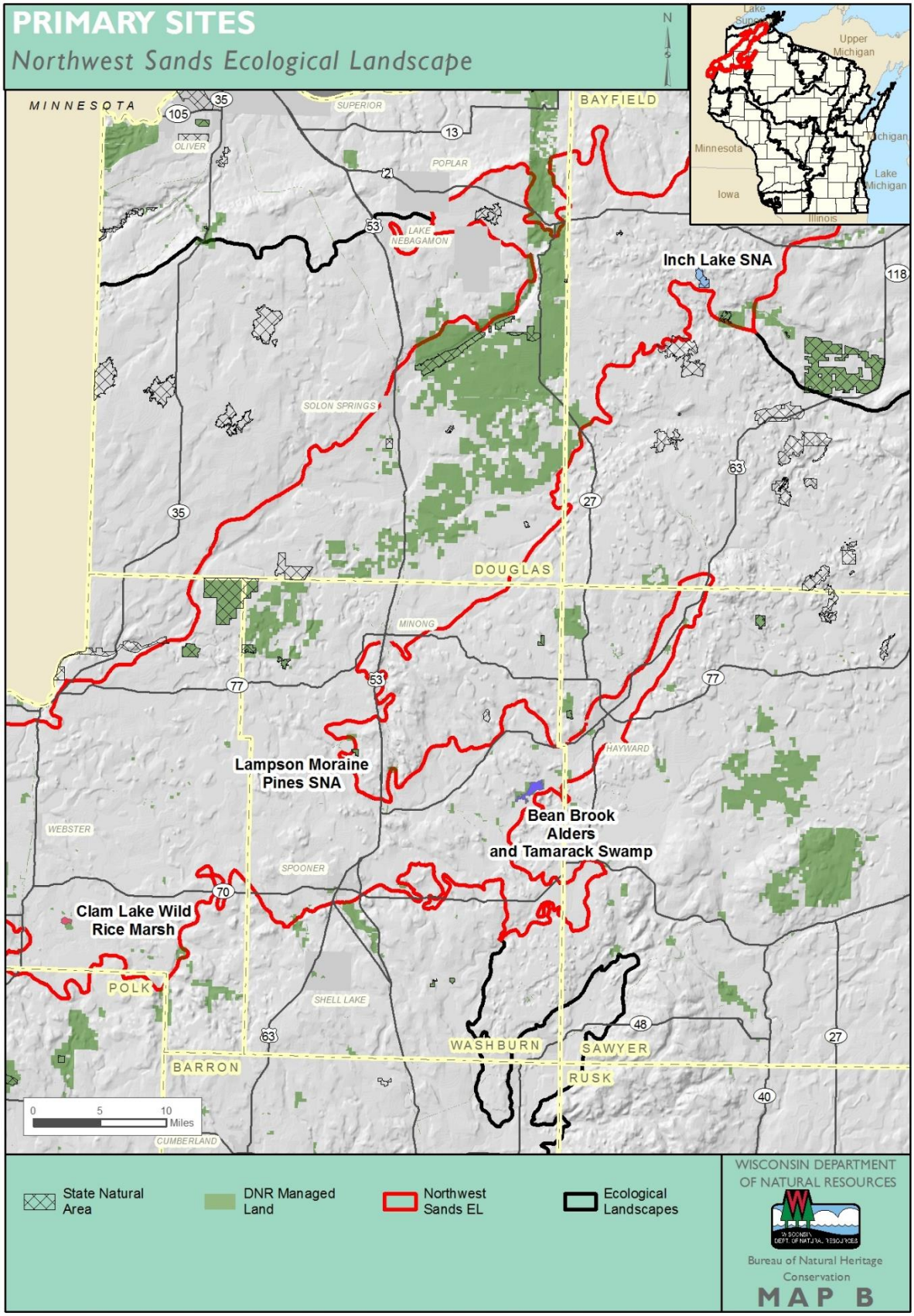
These sites warrant high protection and/or restoration consideration during the development of the property master plan. This report is meant to be considered along with other information when identifying opportunities for various management designations during the master planning process.

Primary Sites are also considered High Conservation Value Forests (HCVFs) for the purposes of Forest Certification, which requires the identification and periodic monitoring of HCVFs. All DNR-managed lands, including state forests, parks, wildlife and fishery areas, and natural areas are certified. Certified forests are recognized by the Forest Stewardship Council (FSC) and the Sustainable Forestry Initiative (SFI) as being responsibly managed (Forest Stewardship Council 2009).

Information provided in the summary paragraphs below includes location information, a site map, summary of the natural features present, important plant and animal species, the site's ecological significance, and management considerations.

The Primary Sites described below are in addition to the sites identified during other Rapid Ecological Assessments and Biotic Inventory Reports that occur within or partially within the Northwest Sands Ecological Landscape. These include:

- Northwest Barrens Planning Group: Douglas County Wildlife Area and Namekagon Barrens Wildlife Area (WDNR 2009)
- Governor Knowles State Forest (WDNR 2010a)
- White River Planning Group (WDNR 2010b)
- Glacial Lake Grantsburg Planning Group: Crex Meadows Wildlife Area, Fish Lake Wildlife Area, Amsterdam Sloughs Wildlife Area (WDNR 2011)
- Totagatic Wild River (WDNR 2013)
- Brule River State Forest (WDNR 2016)


PRIMARY SITES
Northwest Sands Ecological Landscape
N
MINNESOTA
BAYFIELD
SUPERIOR
OLIVER
POPLAR
LAKE NEBAGAMON
Inch Lake SNA
SOLON SPRINGS
DOUGLAS
MINONG
HAYWARD
Lampson Moraine Pines SNA
Bean Brook Alders and Tamarack Swamp
WEBSTER
SPOONER
Clam Lake Wild Rice Marsh
POLK
SHELL LAKE
WASHBURN
SAWYER
BARRON
RUSK
CUMBERLAND
0 5 10 Miles
Lake Superior
Upper Michigan
Minnesota
Lake Michigan
Iowa
Illinois
State Natural Area
DNR Managed Land
Northwest Sands EL
Ecological Landscapes
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MAP B

# NWSEL01. INCH LAKE SNA

## *Location*

| | |
|---|---|
| Landtype Association: | Bayfield Rolling Outwash Barrens (212Ka04) and<br>Bayfield Rolling Outwash and Washed Till (212Ka07) |
| Approximate Size: | 629 acres |

## *Description of Site*

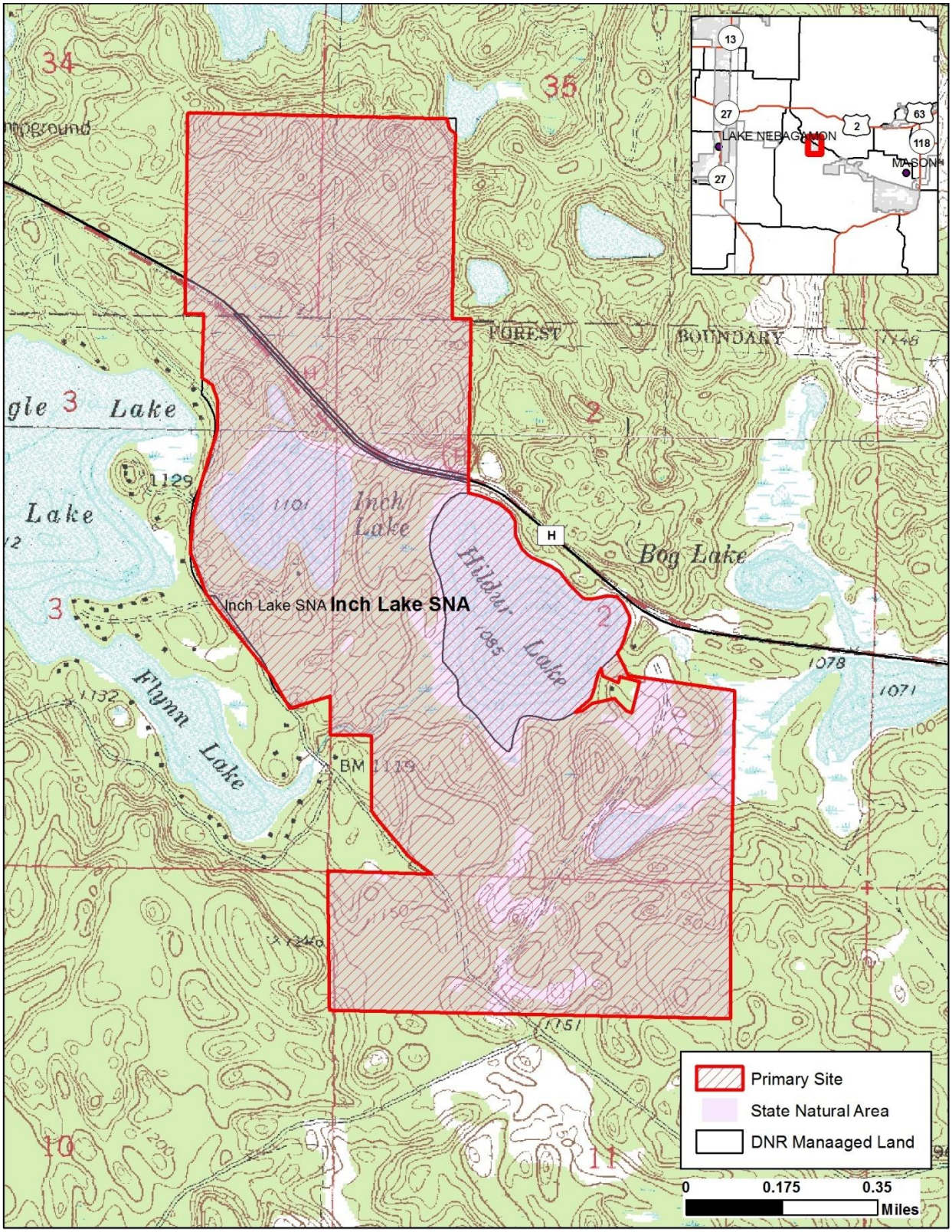
Inch Lake State Natural Area (SNA) features two undeveloped lakes surrounded by wetlands and rolling upland forest. The property abuts the Chequamegon-Nicolet National Forest to the south. Inch Lake is a 31-acre undeveloped, soft-water seepage lake containing largemouth bass, yellow perch, and panfish. Surrounding the southern portion of Inch Lake is an upland forest dominated by red pine, red oak, and aspen. Stands of large red pine and red oak with a diverse ground flora occupy the area north of the lake. Characteristic plants of the forest floor include blueberries, Indian pipe, numerous fern species, and diverse wildflowers. Hildur Lake is a 66-acre hard-water drainage lake on the lower end of the Pike Lake chain. Fish found here include northern pike, largemouth bass, muskellunge, yellow perch, and panfish. Surrounding the lake is a narrow band of leatherleaf and alder which transitions to uplands comprised of mixed northern hardwoods. Red pine complements hardwoods on the rolling hills to the east. Throughout the site, scattered wetland depressions enhance overall diversity of habitats and associated species.

## *Significance of Site*

Inch Lake is classified as a "wild lake," an increasingly uncommon feature on the landscape as development pressure intensifies in northern Wisconsin. No motors are allowed and only artificial lures may be used, providing important research opportunities related to fishing. As headwaters of the White River, Hildur Lake and the associated spring pond are essential to the health of the watershed and associated riparian ecosystems. Inch Lake was designated a State Natural Area in 2006.

## *Management Considerations*

Site objectives are to manage the site as an aquatic preserve and as an ecological reference area. Natural processes will determine the structure of the aquatic communities and associated uplands. The area may also be used to provide opportunities for research and education on the highest quality aquatic communities. The native aquatic and upland species are managed passively, which allows nature to determine the ecological characteristics of the lake. Exceptions include control of invasive plants and animals, and maintenance of existing facilities. Specific considerations: 1) Inch Lake is catch and release only. No use of live bait is permitted. Motors, including electric, are not permitted. 2) Roadside easement area may be managed sporadically by township and county. 3) Although maintaining the walk-in canoe access trail and parking areas is allowed, manipulation/removal of vegetation and soil disturbance should be minimized to the extent possible. Mowing should be timed to avoid dispersal of invasive plant seeds, and mowing equipment should be cleaned if invasive plant seeds are present.




**NWSEL01. Inch Lake SNA Primary Site**

# NWSEL02. BEAN BROOK ALDERS AND TAMARACK SWAMP

### *Location*

Landtype Association: Spooner Plains (212Ka03)
Approximate Size: 672 acres

## Description of Site

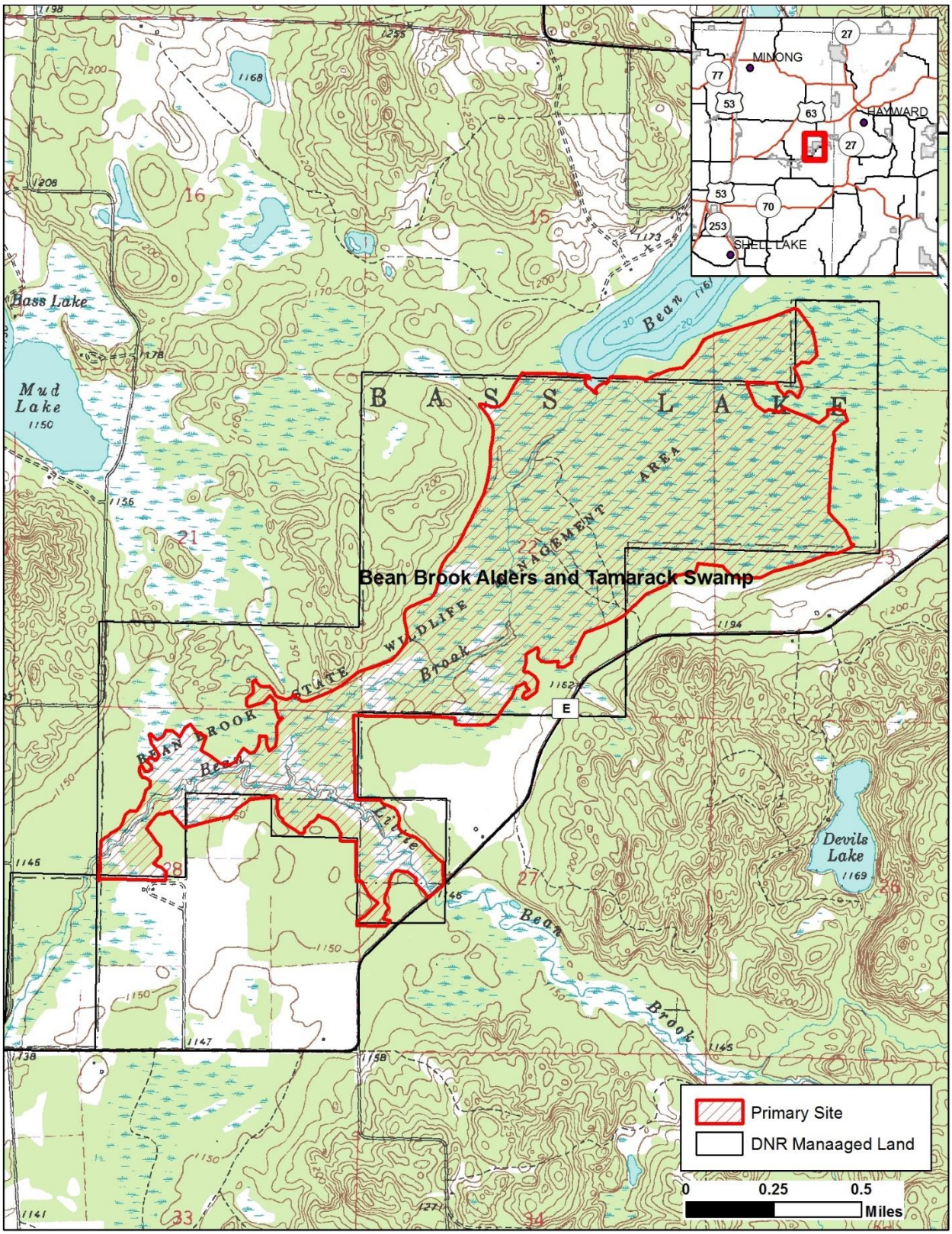
Located in the Bean Brook Fishery Area, an alder thicket of exceptional diversity borders Bean Brook and Little Bean Brook. In portions of the site, the alder grades into northern tamarack swamp toward Bean Brook. While the alder thicket is dominated by its namesake, twenty-five native wetland shrubs are represented, making it one of the most diverse alder thickets known in the state. Other common shrubs include red-osier dogwood (*Cornus sericea*), bog birch (*Betula pumila*), winterberry (*Ilex verticillata*), meadowsweet (*Spiraea alba*), black chokeberry (*Aronia melanocarpa*), alder-leaved buckthorn (*Rhamnus alnifolia*) and willows. Openings in the shrubs contain a wide array of sedges and forbs, as well as large stands of native common reed (*Phragmites australis* var. *americana*). Scattered springs add to the diversity of the site. The northern tamarack swamp is comprised of 5 to 8-inch diameter tamarack with black ash and alder. Uplands adjacent to the site are dominated by managed aspen.

## Significance of Site

The alder thicket is one of most diverse examples of its kind in the state. The site also supports a large breeding population of a rare bird in severe decline elsewhere in the Upper Midwest, while another rare bird was detected in the tamarack swamp. Little Bean Brook is a Class I trout stream, while the stretch of Bean Brook flowing through the site is a Class III trout stream. Several miles upstream, it transitions to Class I closer to its source.

## Management Considerations

Maintaining the hydrology and vegetation structure of the natural communities is essential. Active management, such as alder shearing, would likely be detrimental to the integrity of the system, particularly shrub diversity, and potentially to sensitive wetland soils, especially in occasional spring pockets. Alder is frequently self-perpetuating in sites not prone to invasion by trees, with stands persisting for over 300 years along key portage routes noted by French trappers elsewhere in northwest Wisconsin. While wetlands can absorb enormous amounts of precipitation, road crossings and culverts should be assessed for their ability to handle runoff from 100- to 500-year storm events, which are occurring more frequently than their probabilistic names imply. No invasive species were found in the wetlands during a rapid survey, but periodic monitoring is warranted, particularly for reed canary grass and glossy buckthorn.




**NWSEL02. Bean Brook Alders and Tamarack Swamp Primary Site**

# NWSEL03. CLAM LAKE WILD RICE MARSH

### *Location*

Landtype Association: Siren Plains (212Ka09)

Approximate Size: 190 acres

## Description of Site

The focal point of this primary site is an 80-acre embayment at the southeast end of Clam Lake that supports high-quality wetlands including submergent marsh and wild rice beds. Of the 38 species of aquatic plants identified during recent surveys of the lake/wild rice beds, common waterweed (*Elodea canadensis*), coontail (*Ceratophyllum demersum*), wild celery (*Vallisneria americana*), and northern wild rice (*Zizania palustris*) were the most common (Berg 2016). While this embayment is owned by the public under the Public Trust Doctrine, the surrounding areas of northern sedge meadow, emergent marsh, and a small island at the northern edge of the embayment lie within Clam Lake Wildlife Area. Some small areas of intact sedge meadow remain on the wildlife area, but most of the wetlands surrounding the wild rice marsh are dominated by non-native invasives (reed canary grass, common reed, hybrid cattails) or common native wetland plants.

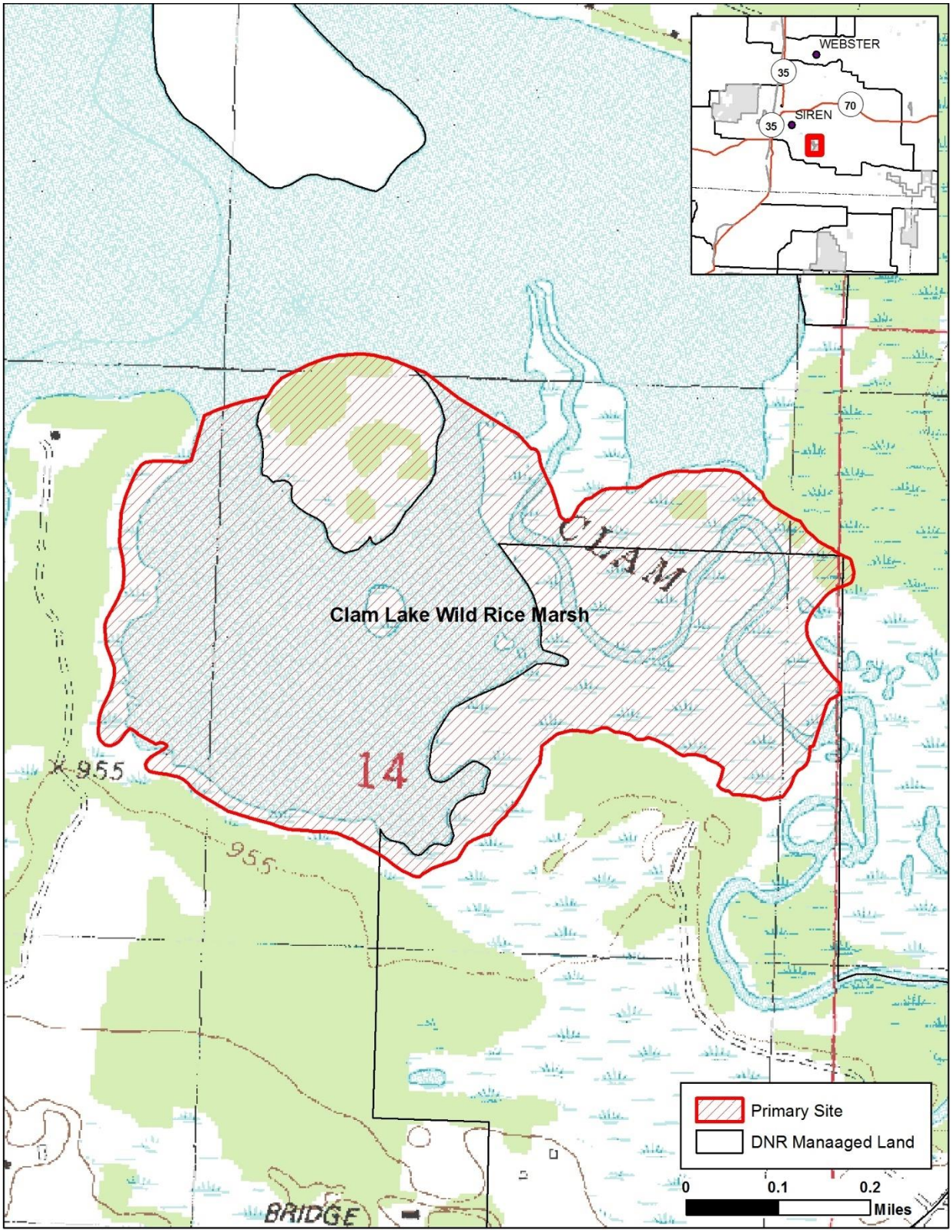
## Significance of Site

The wetlands of this primary site provide important habitat for nesting and migrating waterfowl, nesting marshbirds, and fish reproduction. While none were noted during recent surveys, the small island within the primary site could potentially support nesting colonial water birds such as herons or egrets. The wild rice beds also have cultural significance for the St. Croix Chippewa. Clam Lake was identified as an important conservation target in The Nature Conservancy's Lake Conservation Portfolio (Blann and Wagner 2014).

Historically, Clam Lake was one of the most important wild rice producers in the state, but production has diminished in recent years. A consortium of stakeholders is investigating the wild rice decline and promoting future production on Clam Lake, including the Wisconsin DNR, the Clam Lake Protection and Rehabilitation District, and the St. Croix Chippewa Indians of Wisconsin. The stakeholders suspect that carp have caused the decline, and in 2009 undertook measures to limit their impact by installing 950 feet of nylon mesh to exclude carp from further moving into the embayment, and by contracting fishermen to cull carp within the embayment. Control of non-native invasive aquatic plants has also been done. Baseline surveys of the aquatic plant community were completed, and regular monitoring is done to track impacts of management. Early results are promising, though other factors such as water levels/heavy rainfall may be playing a role as well. This project represents an important case study in wild rice management, and may serve to inform stewardship on other wild rice lakes throughout the region.

## Management Considerations

Scattered reed canary grass (*Phalaris arundinacea*) and hybrid cattail (*Typha X glauca*) were the only non-native invasives species found during detailed surveys of the wild rice marsh in 2016 (Berg 2016). Reed canary grass is also common to abundant in areas of sedge meadow, particularly along the Clam River. Common reed (*Phragmites australis*) occupies large areas within the sedge meadow and emergent marsh surrounding the wild rice marsh basin. Curly-leaf pondweed has been controlled by the lake district. Common buckthorn (*Rhamnus cathartica*) is occasional elsewhere on the wildlife area.




**NWSEL03. Clam Lake Wild Rice Marsh Primary Site**

# NWSEL04. LAMPSON MORAINE PINES SNA

### *Location*

| | |
|---|---|
| Landtype Association: | Webb Lake Collapsed Barrens (212Ka05) and Hayward Moraines (212Xf04) |
| Approximate Size: | 119 acres |

## Description of Site

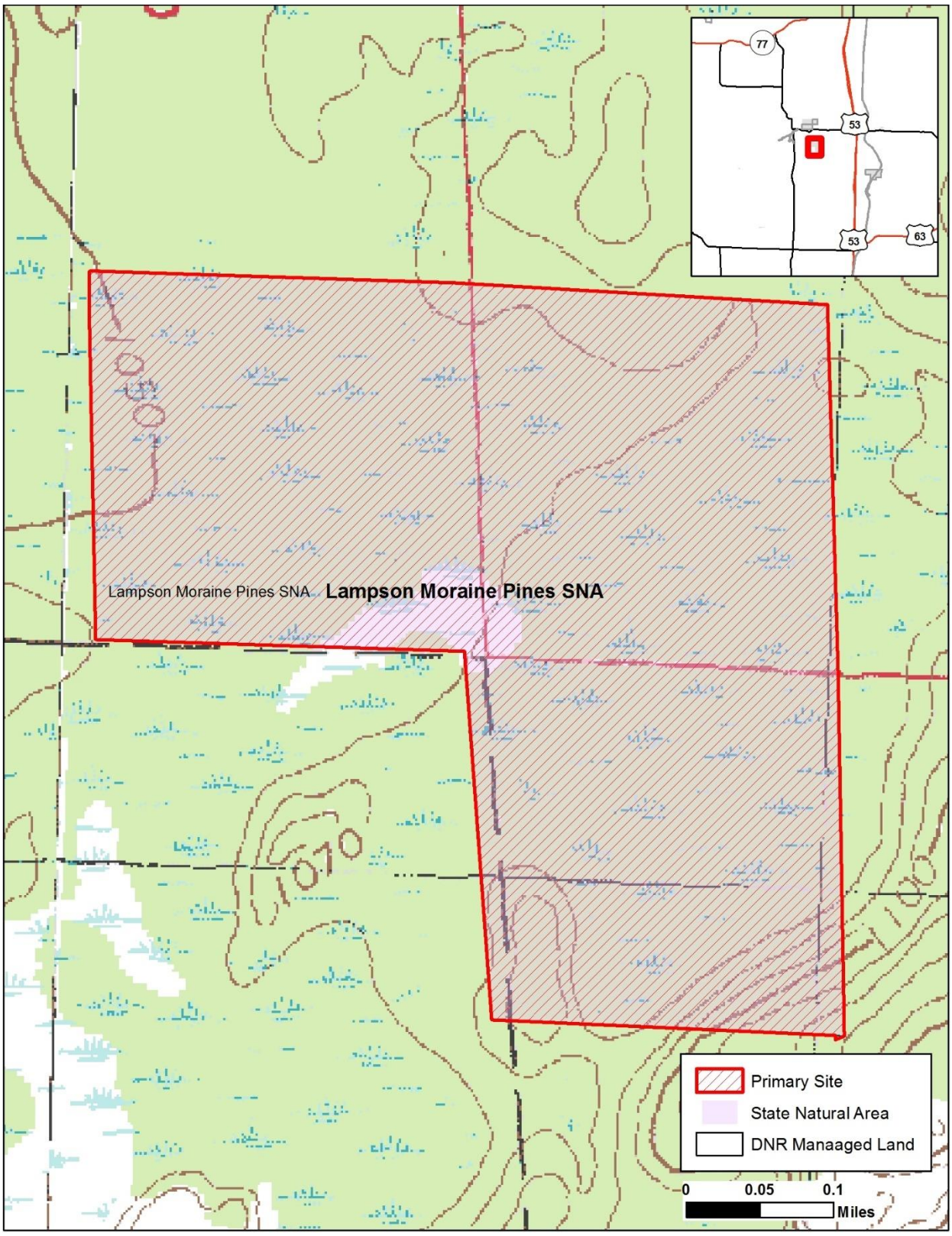
Lampson Moraine Pines SNA features a stand of northern dry-mesic forest with old-growth red pine, many more than two feet in diameter, with occasional white pine. The large red pines have been reduced and thinned by windstorms. Diverse wildflowers grow under the pines such as yellow blue-bead-lily, wintergreen, American starflower, and several species of fern. Also present are forested wetlands in various stages of succession, from sparse, small white cedar and spruce to occasional stands of conifer and swamp hardwoods more than one foot in diameter.

### *Significance of Site*

Several great blue herons have used the pines as a rookery, and a variety of other bird species nest on the property, including blackburnian and chestnut-sided warblers. Lampson Moraine Pines was designated a State Natural Area in 1973.

### *Management Considerations*

Site objectives are to manage the site as a reserve for northern dry-mesic forest, northern wet forest and hardwood swamp, and as an ecological reference area. Natural processes will primarily determine the structure of the forest. The area also provides opportunities for research and education on the highest quality dry-mesic forest and hardwood swamp ecosystems. The native species are managed passively, which allows nature to determine the ecological characteristics of the site. The dry-mesic forest will be allowed to convert over time to a more mesic forest condition. Allowable activities include control of invasive plants and animals, maintenance of existing facilities, and access to suppress fires. Salvage of trees after a major wind event is not considered compatible with management objectives. The access easement is marked and managed to accommodate public walk-in access to the site.




**NWSEL04. Lampson Moraine Pines SNA Primary Site**

# Future Needs

This project was designed to provide a biotic inventory of the biodiversity values for the Northwest Sands Ecological Landscape. Although the report should be considered adequate for master planning purposes, additional efforts could help to inform future adaptive management efforts, along with providing useful information regarding the natural communities and rare species of the NWS EL.

## Invasive Species

- A comprehensive invasive species inventory and management plan is needed. This plan should include a monitoring strategy for detecting and rapidly responding to new invasive threats. This is especially important as the level of infestation of many species in the NWS is relatively low relative to other ecoregions, making early detection and rapid response highly cost-effective compared to waiting until invasives are well-established on the landscape.

## Natural Communities

- Expanded surveys of lakes. Potential survey targets include aquatic macrophytes, shoreline habitat integrity, and water quality monitoring (including phosphorus and Chlorophyll-A), especially of lakes that are not monitored through other programs or projects.
- Monitor wetlands sensitive to nutrient enrichment and invasive species such as poor fens, northern sedge meadows, northern tamarack swamps, and northern hardwood swamps using timed meander surveys.
- Monitoring pine and oak barrens restoration using WDNR Oak Barrens Rapid Monitoring protocol.

## Birds

- Research and monitoring of golden-winged warbler populations to better understand how to ease declines of this species.
- Additional efforts to locate and manage pine barrens habitat that would support the full suite of successional stages of barrens habitat would be beneficial to Kirtland's warbler, sharp-tailed grouse, upland sandpiper, nightjars (common nighthawk, whip-poor-will), and the strongly declining Connecticut warbler.
- Specialized surveys to locate additional populations of state-listed marsh birds (yellow rail, red-necked grebe), which are strongly associated with the Northwest Sands.

## Small Mammals

- A limited effort was undertaken to survey for small mammals during this biotic inventory. Continue small mammal surveys throughout the Ecological Landscape to inventory for rare woodland SGCN (e.g., woodland jumping mouse, northern flying squirrel, woodland deer mouse). Continue surveys of barrens and brushy grasslands for presence of Franklin's ground squirrel.

## Herptiles

- Initiate monitoring of wood turtle (rivers) and Blanding's turtle (lakes/wetlands) and implement nest site protection where appropriate.
- Conduct inventory of gophersnake (bullsnake) and prairie skink in barrens habitat.
- Conduct inventory of mink frog via breeding call surveys.
- Conduct inventory of four-toed salamander within springs, spring creeks, spring-fed bogs, and ephemeral ponds in mesic forest associations.

## Invertebrates

- Continue monitoring of the Karner blue butterfly and other barrens-associated invertebrates.
- Conduct inventory for bees, especially the yellow-banded bumblebee (*Bombus terricola*).
- Conduct inventory for tiger beetles associated with barrens.

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